

16. A method of forming flexible plastic containers and filling with infusion-type solutions, the method comprising the steps of:

- printing of a film wound off a supplying reel;
- dry cleaning the printed film by directing air flow across surfaces of the film and flowing particles removed from the surfaces and the air out through a nozzle such that the film is not touched during dry cleaning;
- aligning the film for folding thereof;
- hot-bar longitudinal welding of the folded film to create a bag;
- sterilizing a cavity of a valve by humidifying the cavity without exposing the cavity to ultraviolet radiation;
- welding the valve to the film using a control algorithm to control the speed and position of a welding head during the welding head's approach to an anvil;
- shaping the bag using hot tools controlled by an algorithm; and
- supplying a high precision dosage of a filling liquid into the bag.

17. The method of claim 16, wherein the hot-bar longitudinal welding of the film creates a vertical seal.

18. The method of claim 16, wherein the cavities of the valve are subjected to humidification outside the bag and without contact with the filling solution by a means to dose the liquid as a function of a volume of the cavity.

19. The method of claim 18, wherein the humidification step is effected by a humidification apparatus located downstream from a vibrator associated with the step of feeding the valves for welding onto the bag, and wherein a humidification control that controls the humidification of the cavities of the valves is located downstream from the humidification apparatus.

20. The method of claim 18, wherein a liquid used for humidification is selected from the group consisting of distilled water, physiological solutions and hydrogen peroxide.

21. The method of claim 19, wherein the humidification apparatus includes a source of sterile liquid, a dosing valve, a fluxstate, and a nozzle that is moved by a piston controlled by a sensor, the nozzle including a lance for penetration into the valve cavities, the discharged sterile liquid being detected by a circuit with electric bridging.

22. The method of claim 20, wherein hydrogen peroxide is used to sanitize and detect electric conductability in the cavities.

23. The method of claim 16, wherein the printing of the film wound off the supply reel is facilitated by a hot printer that includes a hot press, a pigmented film, and a cliché that impresses the film wound off the supply reel.

24. The method of claim 16, wherein the film is dry cleaned with purified air.

25. The method of claim 16, further including the step of welding a suspension ring to the bag.

26. The method of claim 16, further including the step of forming a suspension hole in the bag.

27. The method claim 16, further including the step of accumulating the film prior to aligning the film.

28. The method of claim 16, wherein the filling liquid is precisely dosed in a station that includes an inlet portion having a contribution regulation valve, a constant pressured valve, and a lobed flowmeter having a Hall effect that controls the dosing of the filling liquid.

29. The method of claim 16, further including the step of washing a portion of the film with the filling liquid prior to the bag being welded longitudinally.

30. The method of claim 16, further including the step of transverse welding the film to form the bag.

31. The method of claim 30, wherein the transverse welding is carried out with mobile bars heated by electric resistances of high output having a plurality of temperature control points and cooling effected by mobile cold bars that cool the welding.

32. The method of claim 31, wherein the cold bars contain means for cutting and separating the bags.

33. The system of claim 16, wherein the valve welding is accomplished with a position transducer, a cylinder, a slide, a sonotrode and a piezoelectric transducer.

34. A method of forming flexible plastic containers and filling with infusion-type solutions, the method comprising the steps of:

printing of a film wound off a supplying reel;

dry cleaning the printed film by directing air flow across surfaces of the film and flowing particles removed from the surfaces and the air out through a nozzle such that the film is not touched during dry cleaning;

accumulating the film;

aligning the film for folding thereof;

washing the film with the filling liquid;

hot-bar longitudinal welding and transverse welding of the folded film to create a bag;

sterilizing a cavity of a valve by humidifying the cavity without exposing the cavity to ultraviolet radiation;

welding the valve to the film using a control algorithm to control the speed and position of a welding head during the welding head's approach to an anvil;

shaping the bag using hot tools controlled by an algorithm;

forming a suspension hole in the bag; and

supplying a high precision dosage of a filling liquid into the bag.

35. The method of claim 28, wherein the dry cleaning step occurs prior to sterilization.

36. The method of claim 16, wherein the dry cleaning step further comprises suspending the printed film between air application chambers.

37. The method of claim 16, wherein the dry cleaning step further comprises applying air to the printed film through a first nozzle and removing air from the printed film through nozzles prior to and after the first nozzle in a film travel direction.

38. The method of claim 16, wherein the step of sterilizing a cavity of a valve by humidifying the cavity further comprises controlling humidification in the valve cavity by measuring electrical conductivity in the valve cavity.

39. A method of making a form, fill, and seal container, comprising the steps of:

feeding a flexible film;

suspending the flexible film in a cleaning station;

dry cleaning a surface of the suspended flexible film by blowing a gas toward the surface of the suspended flexible film, removing particles from the surface, and flowing the air and particles away from the flexible film through a nozzle;

forming the container from the flexible film;

filling the container with a substance; and

sealing the container closed.

40. The method of making a form, fill, and seal container of claim 39, wherein the dry cleaning step further comprises passing the suspended film between at least two air nozzles.

41. The method of making a form, fill, and seal container of claim 39, wherein the dry cleaning step further comprises applying the gas to the surface of the film through a first nozzle and removing the gas from the surface of the film through nozzles prior to and after the first nozzle in a film travel direction.

42. The method of claim 39, wherein the dry cleaning step occurs prior to sterilization.

43. A method of making a form, fill, and seal container, comprising the steps of:
feeding a flexible film;
forming the container with the flexible film;
sterilizing at least a portion of the container with humidity;
controlling the humidity by measuring electrical conductivity in the portion of the container being sterilized;
filling the container with a substance; and
sealing the container closed.

44. The method of making a form, fill, and seal container of claim 43, wherein the sterilizing step further comprises the step of sterilizing a cavity of a valve by humidifying the cavity without exposing the cavity to ultraviolet radiation.

45. The method of making a form, fill, and seal container of claim 43, wherein the sterilizing step further comprises humidification of a liquid selected from the group consisting of distilled water, physiological solutions, and hydrogen peroxide.

46. The method of making a form, fill, and seal container of claim 43, wherein the sterilizing step further comprises the step of sterilizing a valve cavity by inserting a nozzle into the valve cavity and discharging a sterile humidified liquid through the nozzle into the valve cavity.

47. A system for making form, fill, and seal containers using a flexible film, comprising:
a film supply station;
a film dry cleaning station downstream of the film supplying station and having an air applicator and an air remover;

a film container formation station downstream of the film dry cleaning station; a container filling station downstream of the film container formation; and a container sealing station downstream of the container filling station.

48. The system of claim 47, wherein the air applicator comprises air applicator nozzles positioned to apply cleaning air to opposite sides of the flexible film.

49. The system of claim 48, wherein the air remover comprises air removal nozzles positioned to remove the cleaning air from the opposite sides of the flexible film.

50. The system of claim 49, wherein the air remover further comprises air removal nozzles upstream and downstream of the air applicator nozzle on each side of the flexible film.

REMARKS

The Office Action was issued on pending claims 1-15. In this Response, claims 1-15 have been cancelled, no claims have been amended, and claims 16-50 have been added. Thus, claims 16-50 are pending in the case.

Specification

This application is a continuation of U.S. Application Serial No. 09/316,165, filed May 21, 1999. The parent '165 application was co-pending with this application; but, now has become abandoned. In the parent '165 application, the original specification and abstract were amended by a preliminary amendment with the filing of the '165 application. Subsequently, the '165 application specification and abstract were further amended and replaced with a substitute specification and abstract. The substitute specification and abstract did not include new matter and were accepted by the Examiner.

The specification and abstract filed with the present application did not include the amendments made in the '165 parent application by the substitute specification. Accordingly, Applicant requests the specification and abstract of the present application be replaced by the substitute specification and abstract from the parent '165 application. The enclosed substitute specification and abstract for the present application are copies of the substitute specification and